

**EFFECT OF ACUPRESSURE ON BLOOD SUGAR
AMONG PATIENTS WITH TYPE 2 DIABETES
MELLITUS AT SRI RAMAKRISHNA HOSPITAL,
COIMBATORE**

REG. NO. 30101402

A Dissertation Submitted to
The Tamilnadu Dr. M.G.R. Medical University,
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In Partial Fulfillment of the Requirement for the

Award of the Degree of

MASTER OF SCIENCE IN NURSING

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PATIENTS WITH DIABETES TYPE 2 MELLITUS

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Abstract

An interventional study was conducted to evaluate the effect of acupressure on blood sugar among patients with Type 2 diabetes mellitus. A Quasi experimental pre-test post-test with control group design was adopted. A purposive sample of 30 patients with Type2 diabetes mellitus was selected in which 15 were in experimental group and 15 were in control group. Acupressure therapy was administered to interventional group. Glucometer was used as the tool to assess the level of blood sugar before and after acupressure therapy. The data was analyzed with descriptive and inferential statistical methods. The result revealed that there was a significant reduction in the level of blood sugar before and after acupressure therapy. Hence, the study concluded that acupressure therapy is effective in reducing the blood sugar level.

Effect of Acupressure on Blood Sugar among Patients with Type 2 Diabetes

Mellitus at Sri Ramakrishna Hospital, Coimbatore

Encouraging people to adopt healthy life styles and appropriate coping strategies are the key aim in health promotion. Diabetes is a chronic condition associated with abnormally high levels of sugar in the blood. The defects in insulin secretion, or action, or both will result in this condition (Zhang, 2010).

Diabetes mellitus, commonly referred to as diabetes was first identified as a disease associated with "sweet urine," and excessive muscle loss in the ancient world. Since, the elevated levels of blood glucose lead to spillage of glucose into the urine, the term is used. The warning signs of diabetes include feeling shaky, weak, confused, lightheadedness, irritability, anxiousness, tiredness or feeling hungry (Sheil, 2010).

Insulin, a hormone secreted in the pancreas controls the blood glucose level. When the blood glucose elevates, insulin is released from the pancreas to normalize the glucose level. Among patients with diabetes, insufficient production of insulin (either absolutely or relative to the body's needs), production of defective insulin (which is uncommon), or the inability of cells to use insulin properly and efficiently leads to hyperglycemia. This latter condition affects mostly the fat tissues and muscles and results in a condition known as "resistance". This is the primary problem in type 2 diabetes (Kang, 2011).

In type 2 diabetes, there is a steady decline of beta cells that adds to the process of elevated blood sugars. Essentially, when insulin is resistant to someone, the body will try to increase production of insulin and overcome the level of resistance to

some extent. After time, when production decreases and insulin cannot be released as vigorously hyperglycemia develops (Avachat, 2007).

Patients often manage diabetes poorly during acute illness. The challenge of diabetes mellitus in a developing country like India is assuming a serious magnitude. At the same time the changes in lifestyle and increase in lifespan is adding to metabolic diseases, thereby doubling the disease burden of the population (Ahuja, 2008).

For patients with diabetes mellitus the blood sugar levels are highest one to two hours after the diet and then it decreases. This change in blood sugar level is reduced among those who take taking several small meals. Taking healthy diet at regular times, with the same amount of carbohydrates in each meal has a greater effect on blood sugar levels. Physical activity is another important part. Regular physical activity improves the body's response to insulin. Keeping exercise schedule and checking the blood sugar levels before, during and after the exercise plays an important role in self care management of diabetes (Mathuri, 2011).

Complementary and alternative medicine is a "group of diverse medical and health care systems, practices, and products that are not generally considered to be part of conventional medicine. Complementary medicine is used with conventional medicine, whereas alternative medicine is used instead of conventional medicine.

Acupressure is one type of complementary medicine that is used to treat several illnesses. Energy therapies have been proved to be useful aid in improving health and wellbeing. Acupressure is an energy therapy that assists individuals with

diabetes in reaching goals for normoglycemia and high quality of life(Thiruvellan, 2010).

Chinese medicine owes its current status to the long history of its practice, dating back more than 2,000 years in a form similar to that utilized today. In one of the oldest books about Chinese medical theory, the Huangdi Neijing, compiled around 100 B.C., the condition diabetes or diabetic exhaustion was mentioned. The literal translation of the term is emaciation-thirst, referring to the disease manifestation when it has gone untreated: namely, one loses body weight despite eating normally, and thirst is persistent. According to this ancient text, the syndrome arises from consuming too much fatty, sweet rich food which occurs commonly among wealthy people. The description fits that of non-insulin-dependent diabetes mellitus (Dong, 2000).

Every patient suffering from diabetes agrees that there is no cure for diabetes. However, people who have undergone acupressure treatments for their diabetes will disagree. Acupressure uses the different pressure points in the body to improve a person's health. It had cured or decreased the severity of their diabetes. It has been seen that when acupressure treatment is added to diet and exercise, the need of medicines diminishes considerably for diabetic patients. In quite a few cases, medicines werealso discarded altogether (Feng& Fen, 2008).

Acupressure therapy is an effective non pharmacological adjunctive strategy for alleviating the development and progression of Type2 diabetes mellitus related complications such as hyperlipidemia, nephropathy, neuropathy and retinopathy (Jin & Chen, 2009).

Energy blockages from stress, trauma, or an injury, are traced to the root of all health problems. The energy flow is based on how a person feels, think, and breathe. Just as negative thoughts can block energy flow, positive thoughts can increase healing energy. When the body's life-force energy becomes blocked, various emotional imbalances and physical symptoms also result. These energy blockages occur at the acupressure points. Through a variety of acupressure methods ranging from light touch, tapping, to simply holding the points, the body's life energy is able to flow and can be rebalanced (Lena & Margaret, 2010).

1.1.NEED FOR THE STUDY

The United Nations estimates the number of people globally affected with diabetes as 246 million and approximately half of those are in India, China, and Nepal and in other Asian countries. Globally, Diabetes is ranked as the fourth leading cause of death, in India in terms of disease. Each year, an estimated 3.8 million death occurs from diabetes related causes, such as cardiovascular disease, stroke, diabetes associated kidney dysfunction, diabetes associated nerve dysfunction and diabetes associated eye disorder.

India has the world's largest diabetic population with almost 51 billion people suffering with the condition and the cost of diabetic management is getting increased since day by day. As the cost of the diabetic management is becoming higher the households of lower income family group are facing much difficulty to manage the condition. This makes the public to turn more and more to alternative therapies to manage the condition (WHO, 2010).

In Tamilnadu, 9% prevalence of known diabetes was found among a population of 150. One of the major causes of diabetes cited among the urban people was lack of the required physical activity. Diabetes and obesity rates just keep climbing at an alarming pace in these cases (Senthilnathan, 2011).

Type 2 diabetes is an illness that gradually forms over a long period of time, which can be 20 years or more. It might not bring any obvious serious pain or discomfort in the first 10 years, but when one of the vital organs (usually kidney first) starts to fail, the other effects begins. The malfunction of one organ can speed up the damage to other vital organs and it will take away one's life in less than 2 years since the occurrence of first serious disorder (Brunner&Sudharth, 2005).

Acupressure therapy is an effective non pharmacological adjunctive strategy for alleviating the development and progression of Type 2 diabetes related complications such as hyperlipidemia, diabetes associated kidney dysfunction and neuropathy (Bethesda, 2008).

People with diabetes require multiple interventions to reach their glycemic goals. Energy therapies are useful aids in improving health and wellbeing. Energy therapies like acupressure assist individuals with diabetes in reaching goals for normoglycemia and high quality of life (Guthrie, 2001).

Acupressure therapy is effective in relief of stress related ailments and boosting immune system. Acupressure increases circulation, reduces pain, develops spirituality and vibrant health. When acupressure points are stimulated they release muscle tension, promote circulation of blood and enhance body's life force energy to aid healing (Pilana, 2011).

Acupressure has a high electrical conductivity at the surface of the skin and thus has a healing energy effect. Acupressure treatments help the body organs to correct imbalances in digestion, absorption, and energy production of activities and in circulation of the vital energy through the meridians. This improved energy and biochemical balance achieved by acupressure encourages the body's natural healing abilities and promote physical and emotional wellbeing (Chezhiyan, 2007).

Acupressure will alter the brain chemistry and releases neuro transmitters and neurohormones in a good way. It also affects the parts of the central nervous system being connected to sensation and involuntary body functions, such as immune reactions and processes thereby a person's blood pressure, blood flow and body temperature are regulated (Griffitus, 2008).

Acupressure maintains the functioning of the central nervous system improves blood circulation and metabolism, enhances the recovery and regeneration of damaged tissues of the lesion. After acupressure therapy, most patients experience a relief of symptoms, a comfortable and relaxed feeling, sound sleep, improved appetite and increased body weight. However, some patients feel a sense of discomfort for a shorter period. In general, it is only a temporary response to the treatment and will disappear after the treatment is continued for 2-3 more days. An explanation is necessary to relieve the patients worry about the temporary setback (Watson, 2010).

There is no cure for diabetes in allopathic system of treatment, but alternative therapies like acupressure offers prevention and cure possibilities. People who have undergone acupressure for diabetes healing find improvement in blood glucose level

after acupressure treatment. So acupressure plays a significant role in reducing the blood sugar level among patients with Type2 diabetes mellitus (Khan, 2009).

Patients with complications of diabetes require additional and continuing expenses for specialized care. A recent analysis has showed the average expenditure for diabetes in India to be Rs.28, 000/annum in sub urban areas and Rs.20, 000/annum in rural areas (Ling, 2011).

Realizing this fact, the investigator instituted the acupressure therapy to reduce blood sugar level among patients with type 2 diabetes mellitus as a non-pharmacological measure.

1.2.STATEMENT OF THE PROBLEM

EFFECT OF ACUPRESSURE ON BLOOD SUGAR AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS AT SRI RAMAKRISHNA HOSPITAL, COIMBATORE

1.3. OBJECTIVES

- 1.3.1.To assess the blood sugar level among patients with type 2 diabetes mellitus.
- 1.3.2. To apply acupressure among patients with type 2 diabetes mellitus.
- 1.3.3. To assess the blood sugar level among patients with Type2 diabetes mellitus after acupressure.

1.4. OPERATIONAL DEFINITIONS

1.4.1. Effect

It refers to the desired change on blood sugar brought after the acupressure and is measured in terms of reduction in the level of blood sugar for patients with Type2 diabetes mellitus.

1.4.2. Acupressure

It refers to the application of acupressure over the acupoints Spleen 6, Liver 3, Kidney 3 & Stomach 40 for 5 minutes on each acu point located on the leg twice a daily for reducing the blood sugar level.

1.4.3. Blood Sugar

The level of blood sugar which is raised or reduced depends upon the insulin secreted in the body.

1.4.4. Type 2 Diabetes Mellitus Patients

Patients diagnosed with Type2 diabetes mellitus aged above 45 years, with random blood sugar ranges above 140 mg/dl who are admitted in Sri Ramakrishna Hospital.

1.5. CONCEPTUAL FRAMEWORK

A conceptual model broadly presents an understanding of the phenomena of interest and reflects the assumptions and philosophical view of the designer. This model represents world views about the nursing process and nature of nurse patient relationship.

According to Wiedenbach's prescriptive theory, nursing is nurturing and caring for someone in a motherly fashion. The theory directs an action towards an explicit goal.

In this study the goal is to assess the effect of acupressure for reducing the blood sugar among patients with type II diabetes mellitus in a selected hospital, Coimbatore. Wiedenbach's theory was chosen as conceptual framework for this study. It consists of 3 components such as identification, ministration and validation.

1.5.1. Identification

Patients with Type II diabetes mellitus undergoing treatment were selected based on the demographic variables including age, sex, educational status, occupation, medications undertaken, diet, personal habits, anthropometric measurement and investigations.

1.5.2. Ministration

The researcher randomizes the samples into experimental group and control group. The experimental group receives intervention and the control group receives only routine care. Before administering acupressure therapy random blood sugar was checked for both the experimental group and control group.

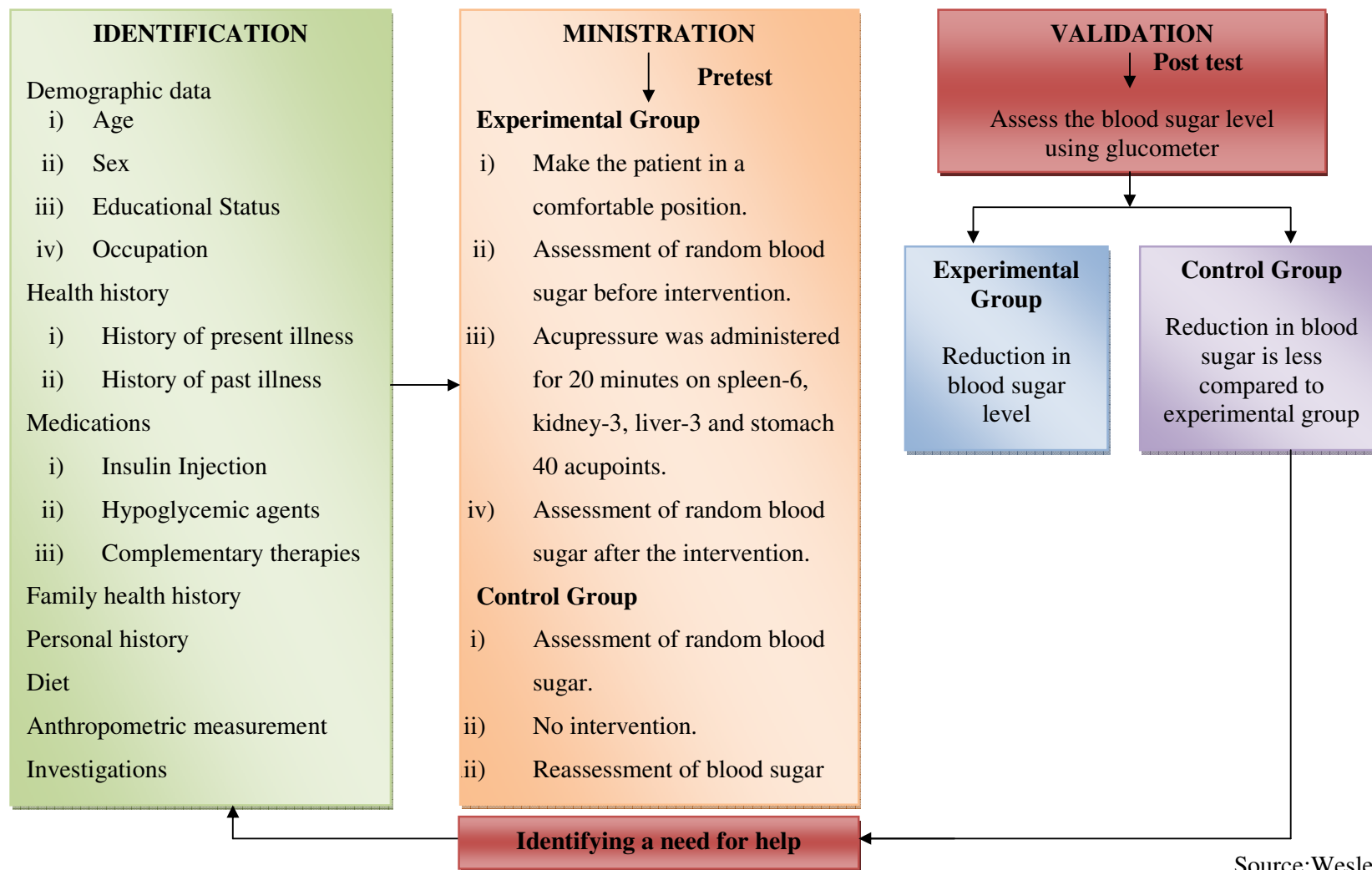
Acupressure therapy was administered in the following acupoints such as Spleen6 (Sp6), Liver3 (Liv3), Kidney3 (K3) and Stomach40 (St40) of both legs alternatively. Sp6 is located on inside of the lower leg, one hand width above the tip of the ankle bone. Liv3 is located in the foot on the line between big toe and second toe. The point is located about 3 finger width from the edge, in the depression. K3 is

located inside of the foot between the Achilles tendon and the ankle bone. St40 is located on the anterior aspect of the lower leg, 8 fingers superior to external malleolus. Acupressure therapy was given in circular motion for 5 minutes on each acupoint. The therapy was given in morning and evening sessions. After acupressure, random blood sugar was checked for both the experimental group and the control group.

1.5.3. Validation

In post-test the researcher reassess the effect of acupressure among the experimental group using glucometer.

FIG. 1.1. CONCEPTUAL FRAMEWORK BASED ON WIEDENBACH'S HELPING ART OF CLINICAL NURSING THEORY (1964)



1.6. PROJECTED OUTCOME

Acupressure on patients with type 2 diabetes mellitus will help to reduce the blood sugar level to a greater extent.

REVIEW OF LITERATURE

The review of literature is defined as a broad, comprehensive, systematic & critical review of scholarly publication, unpublished materials and personal communication. It helps the researcher to develop insight into problems stated. The present chapter discusses the review of literature pertinent to the study. The literature review is discussed under the following headings.

- 2.1. Literature related to Type 2 diabetes mellitus
- 2.2. Literature related to acupressure
- 2.3. Literature related to the effectiveness of acupressure on blood sugar.

2.1. LITERATURE RELATED TO DIABETES MELLITUS

India has initiated its defence against diabetes with an initial investment of 1430 crores to start the process of prevention and treatment of diabetes. The country aims to screen 150 million people with diabetes around 2012. Indian companies have played a significant role in getting affordable medicines and technologies from countries around the world and advocated increased access to drugs and alternative therapies for managing diabetes. This resulted in easy access to affordable, newly developed medicines and alternative therapies (Ling, 2011).

A descriptive study was conducted to know the quality of life, wellbeing, social support & coping strategies among patients with diabetes mellitus. When quality of life was assessed in individuals with diabetes mellitus and with impaired glucose tolerance, more subjects with impaired glucose tolerance rated their general perceived health as being excellent to good (83.49%) than to diabetes mellitus

(72.25%). Similarly education about primary prevention among family members of patients with Type 2 diabetes resulted in improved awareness about personal risk, but did not cause psychological harm (Moyses, 2011).

A longitudinal study examined the influence of family, social and behavioural variables on diabetes self care management. Self efficacy, maturity, family, social support and attitudes of adults towards management of diabetes were assessed among 87 adults at 3 weeks, 6 weeks and 9 weeks intervals. The results revealed that 75% of people faced difficulty and barriers in setting goals for improving diabetes management practices and coping up with the life style changes (Shang, 2002).

A study was conducted among diabetes patients to know the severity associated with complications of diabetes. Totally, 30 samples were selected using purposive sampling method. The results revealed that, as time progresses high blood glucose levels damages nerves and blood vessels, leading to complications such as heart disease and stroke, which is the leading cause of death among people with diabetes. Uncontrolled diabetes also results in vision loss, kidney failure and amputations (Thomas, 2010).

A comparative study was conducted among people with diabetes and those who were non-diabetic on risk of developing heart diseases. The results revealed that people with diabetes are at higher risk to develop heart diseases or stroke at an earlier age than others (Bawadi, 2009).

A study was conducted among 50 samples on the influence of smoking in diabetes. The results revealed that smoking among diabetes doubles the risk of

developing heart disease. This is because smoking causes narrowing of blood vessels and results in long term complications such as vision loss and peripheral arterial disorders (Miller, 2009).

The information from the statistical review of WHO revealed steps to reduce the risk of developing diabetes. They suggest that healthy diet, physical activity, ideal body weight and quitting of smoking plays a significant role in risk reduction (WHO, 2010).

A study was conducted on 'economic cost of diabetes care' with the objective of assessing the present state concerning the treatment of clients with diabetes and cost figures in rural and urban parts in Bangalore. A random unbiased selection of 620 respondents was taken for the study. The conclusions suggest the importance to develop simple cost – effective protocol for managing the condition (Giffany, 2011).

A prospective diabetes epidemiological study was conducted in UK on management of hypertension among adults with diabetes. A 10mm Hg reduction in mean systolic blood pressure resulted in reduction in 12% of complications related to diabetes, 15% of deaths related to diabetes, 11% of myocardial infarction and 13% of micro vascular complications (Rovner, 2010).

A study was conducted on assessing the effectiveness of Inj. Lucentis, Inj. Trivaris and Laser therapy among patients who were affected with retinopathy due to severity of diabetes. One group received Inj. Lucentis along with laser treatment. Another group received Inj. Trivaris which is a steroid drug along with laser treatment. The results revealed that patients who underwent Laser therapy plus Inj.

Lucentis showed improvement in vision after 4 weeks of treatment when compared to the other group (Khan, 2010).

2.2. LITERATURE RELATED TO ACUPRESSURE

Applying gentle pressure on precise acupoints called acupressure is believed to stimulate the central nervous system to release chemicals into the muscles, spinal cord and the brain. These chemicals release hormones that influence the body's natural healing abilities and promote physical and emotional wellbeing. Thus the blood sugar level normalizes without any negative side effects, but with positive effects (Tonja, 2010).

A study was conducted in Taiwan for assessing the effectiveness of acupressure in relieving low back pain. For the study, 130 patients with chronic low back pain from a specialist orthopaedic clinic were selected. All the patients completed a standard disability questionnaire before being randomly allocated to 2 treatment groups. Among the 130 patients, 65 patients received 6 sessions of acupressure and 65 patients received physical therapy. Results were analyzed immediately after treatment & again after 6 months. The mean disability score after the treatment was significantly lower in the acupressure group (5.67) than in the physical therapy group (11.29). So the study concluded that acupressure is very effective in reducing back pain (Jones, 2006).

A study was conducted among 44 subjects diagnosed with chronic obstructive pulmonary disease from 3 regional hospitals in Taiwan. A randomized block experimental design was used for selecting the samples and data collection was done. Using age, gender, pulmonary function, smoking history and taking steroid treatment

as matching factors, 44 subjects were randomly assigned to two groups. The first group received acupressure on specific acupoint (K7) and the second group received acupressure other than the specific acupoint. The results revealed that the group receiving acupressure on K3 was relieved from dyspnea and it also enhances circulation. Both acupressure programs lasted 1 week with 14 sessions / wk that lasted 20 minutes per session. Results concluded significant greater improvements among patients receiving acupressure at specific acupoints (Benhar, 2009).

A study was conducted to assess the relative merits of applying acupressure among a group of stroke patients. A specific form of acupressure known as Jin Shin was used in 16 stroke survivors who participated in the study. In the course of 2 weeks, the volunteers of the study received Jin Shin acupressure. A consistent benefit in relation to heart rate was found during Jin Shin intervention. The study concluded that active acupressure, reduced heart rate significantly more than did placebo acupressure during treatments (Gardner, 2008).

A study was conducted in the National Institute of Oncology to know the effect of acupressure as a valuable tool for patients undergoing treatment for cancer. A wrist band that stimulates Neiguan (P6) acupoint was applied to 34 patients undergoing chemotherapy who were suffering with the complaints of nausea and vomiting. The results showed a decline in severity of nausea and reduction in vomiting episodes among cancer patients after acupressure (Benson, 2007).

A study was conducted in Taiwan to assess the effect of acupressure for insomnia. A total of 50 men & women with insomnia were selected as participants in a randomized controlled trial. Half of the study volunteers were provided with

standard acupressure on HT1 points of both wrists. The control group received only light touch at the same wrist acupoint. The duration of the study was 1 week & researchers utilized Athens Insomnia scale and patient Questionnaires as a means of quantifying pre-test and post-test sleep quality. The study concluded that acupressure was effective in reducing insomnia (Nina, 2009).

A comparative study was conducted in Department of Rehabilitation, Kaohsiung Medical University in Taiwan to determine the efficacy of medications versus acupressure among 28 patients with chronic headache. Baseline measures of self-appraisal scores and headache related quality of life were documented at the beginning of the study after 1 month of treatment. Pain ratings based on visual analog scale was found to be significantly lower in acupressure group. The study concluded that acupressure can be used as an alternative therapy for conventional medicine (Farton, 2010).

A study was conducted in Mexico State University on the effectiveness of acupressure among nurses who are continuously exposed to stressful environment. Twelve samples were chosen for the study. One group pretest – post test design was used. The results concluded that there was an overall reduction in anxiety, headache, work stress and anger after the acupressure therapy (Niyx, 2001).

2.3. LITERATURE RELATED TO DIABETES & ACUPRESSURE

A study was conducted to assess the effectiveness of acupressure among patients with Type 2 diabetes mellitus. For the study 28 patients with type 2 diabetes who were undergoing treatment with standard diabetic medications were selected. The samples were randomly assigned into experimental group and control group. The

experimental group received 20 minute session of acupressure therapy 2 times / day and the control group received hypoglycemic agents as treatment. Before the intervention, the blood sugar level was assessed using glucometer. The acupoints were Sp6, St40, K3 and Liv3.

SP6 (Spleen meridian)

Location: On the inside of the lower leg, one hand width (4 Fingers) above the tip of the ankle bone.

LIV3 (Liver meridian)

Location: On the foot on the line between the big toe and the second toe. The point is located about 3 finger width from the edge, in the depression.

K3 (Kidney meridian)

Location: On the inside of the foot, half way between the Achilles – tendon and the ankle bone.

ST40 (Stomach meridian)

Location: On the anterior aspect of the lower leg, 8 Fingers superior to external malleolus.

The intervention time was selected two hours before and two hours after the meals and medication. The blood sugar was assessed before and after the intervention. At the end of one week study, the blood sugar results showed comparative reduction in the experimental group when compared to the control group. The study concluded that acupressure is effective in reducing blood sugar level among patients with Type 2 diabetes (Leander, 2009).

A study was conducted to know the effectiveness of acupressure among patients with type 2 diabetes in Singapore. The researchers recruited 60 patients with diabetes and divided them randomly into two groups: the acupressure group (38 patients) and the control group (22 patients). The two groups were found to be well matched for symptoms and laboratory results (blood and urine tests). Both groups followed a regulated diet during the study, but one group received acupressure. Acupressure was administered twice a day for 7 days. The main acupressure points used were SP-6, ST-40, LIV-3 and K-3. The results show that there was considerable reduction in the blood sugar in the experimental group when compared to the control group (Hson, 2001).

A study was conducted to know the Modern Clinical Necessities for Traditional Chinese Medicine-Acupressure in Beijing. The acupoint sanyinjiao (SP-6) was used as the primary treatment, with adjunctive points according to syndrome differentiation for 30 patients with diabetes. Among that, the common adjunct points were sanjiaoshu (Liv-3) for thirst and dryness of the mouth; zusanli (ST-40) for hunger; and shenshu (K-3) plus sanyinjiao (Sp-6) for polyuria. Treatment was administered twice daily for 7 days as a course of treatment, then a 2-3 day break was allowed before starting another course up to 7 days. The results show that the effectiveness of treatment was better for younger patients than for older patients (Wang, 2002).

A study was conducted to assess the effects of acupressure on lower limb blood flow for treatment of peripheral arterial diseases associated with diabetes. A total of 30 patients were selected in which 24 underwent acupressure. The

acupoints were Sp-6, Liv-3, K-3 and St-40. The results found that this treatment modality is effective for treating the symptoms associated with peripheral arterial diseases and thereby treat diabetes (Nikonenko, 2004).

A study was conducted on treatment of diabetic neuropathy using Integrative Chinese and Western medicine in China. Post-test one group only design was used for the study. The results showed that acupressure was effective in reducing the free radical injury, which plays a key role in pathology of vascular complications in diabetic neuropathy (Chin, 2008).

A study was conducted in Mexico State University on 'A short stress relieving programme with acupressure to lower the blood sugar level and improve health in diabetic patients'. The intervention consisted of 15 minutes of acupressure with the goal of reducing the blood sugar level. Exploratory research study was conducted with one group-pretest posttest design. All the patients experienced an overall reduction in blood sugar. The result of the research supports the need to integrate holistic health concepts and practices into rural health care systems (Gerald, 2010).

A study was conducted on Acupressure for diabetes in Mexico. The results had revealed that applying acupressure to the specific acupoints such as Sp-6, K-3, Liv-3 and St-40 will stimulate the central nervous system to release chemicals into the muscles, spinal cord and brain. These chemicals release other hormones that influence the body's natural healing abilities and reduce the blood sugar levels (Altesino, 2007).

A study was conducted to assess the effect of auricular pellet acupressure on anti oxidative systems in high risk diabetes mellitus. The study involved 69 persons

with high-risk DM, who were allocated either to undergo acupressure as active treatment for experimental group or to a control group. The experimental group received auricular pellet acupressure 3 times daily for 5 consecutive days. After a 2 day rest period, the procedure was performed on contralateral ear. Acupressure was performed twice on each ear with each application followed by its application to contralateral ear over a period of 7 days. Serum concentrations of superoxide dismutase and catalase concentrations were significantly higher in experimental group than in control group. Findings suggest that auricular pellet acupressure can increase the concentration of anti oxidative enzymes in persons with high risk diabetes mellitus (Lin, 2008).

A study was conducted to assess whether acupressure is useful in the management of diabetes. Eight lean well controlled patients with Type 2 diabetes using usual dosages of regular and intermediate acting insulin, who had undergone acupressure experienced higher insulin levels and lower serum glucose levels by 15 minutes after start of acupressure and 29 minutes post injection. At this interval changes were not statistically significant. Serum glucose levels, was 8.3% lower ($P<0.05$) after 30 minutes of acupressure and 44 min post injection compared to the control group where participants had not underwent acupressure. After 20 minutes acupressure, the difference in glucose level was greater for the experimental group (76mg/dl) when compared to control group (89mg / dl) (Taller, 2009).

An awareness programme was conducted for trained clinical staff to administer 15minutes sessions of acupressure to diabetic patients. The study was conducted for 1 week using pretest, post test with control group design with a sample

size of 12. Patients experienced a reduction in blood sugar, anxiety and headaches (Chen, 2004).

A study was conducted to determine effectiveness of acupressure therapy in preventing diabetic complications. A total of 34 patients with type 2 diabetes mellitus were selected for the study. All participants of the study were treated with conventional medicines plus diet & exercise programs to manage hyperglycemia. One group was randomly assigned to undergo twenty minute session of acupressure 4 – 6 times a week. At the end of the study period, patients in the acupressure group had lower level of blood glucose, total cholesterol, triglycerides and LDL cholesterol and higher levels of HDL cholesterol. Nerve conduction velocity was also significantly higher in the acupressure group. Serum creatinine and urine protein, were similar between both groups at the end of study follow up. These results suggest that acupressure helps in preventing diabetic complications such as kidney failure and nerve damage (Jung, 2004).

METHODOLOGY

Research methodology is a systematic quest for undiscovered knowledge. In research methodology the various steps that are generally adopted by the researcher in studying the research problem is discussed along with logic reasons. It also helps the researcher to explain specifically and clearly the various criteria, techniques, sampling and research design selected for the study. The study was designed for evaluating the effect of acupressure among patients with Type 2 diabetes mellitus for reducing the blood sugar. The following topics are discussed in detail. It includes research design, setting, population, criteria for sample selection, variables of the study, materials for data collection, validity of the tool, hypothesis, reports of pilot study and main study and techniques of data analysis and interpretation.

3.1. RESEARCH APPROACH

A Quantitative approach was used to evaluate the effect of acupressure on blood sugar among patients with Type 2 diabetes mellitus.

3.2. RESEARCH DESIGN

The research design selected for the study was Quasi experimental Pretest-Posttest with control group design. The design was found to be effective in identifying the effect of acupressure on blood sugar level.

3.3. SETTING

The study was conducted in Sri Ramakrishna Hospital, Coimbatore. Patients who were admitted in the medical ward, surgical ward, neuro ward and special wards were selected as samples for the study. Surgical ward consists of 52 beds, medical

ward consists of 54 beds, special wards consist of 93 beds and neuro ward consists of 23 beds. Clients affected with type 2 diabetes mellitus treated in the medical ward, surgical ward, neuro ward and special wards of Sri Ramakrishna Hospital were selected for the study.

3.4. POPULATION

A total number of 33 patients were admitted with Type 2 diabetes mellitus, one patient was not willing to undergo the intervention and two patients were having blood sugar level less than 140mg/dl. So 30 samples with Type 2 diabetes mellitus were selected for the study.

3.5. CRITERIA FOR SAMPLE SELECTION

Inclusion Criteria

- i) Patients with Type 2 diabetes mellitus who are aged above 45 years.
- ii) Patients of both genders with Type 2 diabetes mellitus admitted in medical, surgical, neuro and special wards of Sri Ramakrishna Hospital.
- iii) Patients who were undertaking insulin therapy for reducing the blood sugar.

Exclusion Criteria

- i) Patients who are suffering with complications of diabetes mellitus such as diabetic foot ulcer, diabetic ketoacidosis, hyper osmolar hyper glycaemic syndrome and micro angiopathy.
- ii) Patients with blood sugar level below 140 mg/dl.

3.6. SAMPLING

Purposive sampling of 30 patients with Type 2 diabetes mellitus aged above 45 years were selected for the study.

3.7. VARIABLES OF THE STUDY

Dependent Variable

The dependant variable is to reduce the blood sugar among patients with Type 2 diabetes mellitus.

Independent Variable

The independent variable is acupressure therapy.

3.8. MATERIALS

The following materials were used for data collection.

3.8.1. Demographic Data Profile to collect information about the patients.

3.8.2. Glucometer is used to assess the random blood sugar among the patients (Tom Clemens, 1960).

3.8.3. Acupressure is used to apply pressure on the acupoints located on the leg (Chinese Medicine).

3.8.1. Demographic data profile: This includes age, gender, educational status and occupation. Health history includes history of present illness, history of present illness, past illness which includes intake of any insulin injection, hypoglycemic agents and the complementary therapies undertaken. The data profile also consists of family health history, personal history which includes personal hygiene, diet, mobility, exercise and habits. Followed by that anthropometric measurement, vital signs and investigation were also included.

3.8.2. Glucometer: Tom Clemens (1960) invented the glucometer. This is a standard device which consists of the parameter to check fasting, random & postprandial blood sugar levels. A nationally accepted standard error of glucometer is within 20%. A 20%

variation in reading is an acceptable difference according to experts. The random blood sugar value above 140mg/dl is considered as diabetic (Elusiyan, 2006).

3.8.3. *Acupressure Tool*: Chinese medicine has developed acupressure, as part of its healing methods. Acupressure was developed by proving the existence of the meridian system which has been known about and documented by Chinese for 5000 years. Today with the help of leading-edge devices and machines these energies are detected (Dong, 2000).

3.9. INTERVENTIONAL PROCEDURE

The acupressure points for reducing the blood sugar are Liv-3, St-40, Sp-6, K-3. At first, the blood sugar level of the patient is assessed through pretest. Then acupressure is administered as intervention. After the intervention, post test is performed by checking the random blood sugar for knowing the variations.

Pre-Preparation

1. Articles needed: A tray containing glucometer, glucometer strips, lancets, a bowl with cotton balls, stop watch and paper bag.
2. Explain the steps of procedure.
3. Make the patient comfort.

Procedure

1. Wash hands.
2. Check the random blood sugar for both experimental and control group.
3. Apply acupressure on the acupoints located in the leg.
4. Acupressure therapy must be given alternatively to each leg.

5. The various acupoints are Sp-6, Liv-3, K-3 and St-40. Sp6 is located on inside of the lower leg, one hand width above the tip of the ankle bone, Liv-3 is located on the foot on the line between big toe and second toe. The point is located about 3 finger width from the edge, in the depression. K-3 is located on inside of the foot between the Achilles tendon and the ankle bone. St-40 is located on the anterior aspect of the lower leg, 8 fingers superior to external malleolus.
6. Acupressure therapy was given in circular motion for 5 minutes on each acupoint. The therapy was given in morning and evening sessions.
7. After the acupressure, random blood sugar was checked for both experimental group and control group.

3.11. HYPOTHESES

- H₀: There is no significant difference in bloodsugar level among experimental group and control group before acupressure.
- H₁: There is a significant difference in blood sugar level among experimental group before and after acupressure.
- H₂: There is no significant difference in blood sugar level among control group before and after acupressure.
- H₃: There is a significant difference in blood sugar level among experimental and control group after acupressure.

3.12. PILOT STUDY

A pilot study was conducted to find out the feasibility and practicability of the study. Pilot study was conducted at Sri Ramakrishna Hospital, Coimbatore. Data

collection period was for 10 days. Purposive samplings of 6 subjects were selected for the study. The blood sugar was checked using the glucometer. Acupressure therapy was administered according to the blood sugar levels. The intervention was given for 20 minutes daily, morning and evening sessions for 1 week for each person. Blood sugar was checked before and after the intervention. Data collected were tabulated and analyzed using descriptive statistical methods and results show that blood sugar level was reduced on application of acupressure. Hence, the study is feasible and practical.

3.13. MAIN STUDY

The data was collected for 30 days. The study was conducted in Sri Ramakrishna Hospital at Coimbatore from June 20 to July 20. Adults who satisfied the inclusion criteria were selected for the study. Initially the patients were assigned into experimental group and control group. The total size of sample was 30. In each group, 15 samples were allotted. The baseline data were obtained by interviewing the patient. The blood sugar level was assessed before and after the acupressure. Acupressure therapy was administered according to the blood sugar levels. The intervention was given for 20 minutes daily, morning and evening sessions for 1 week for each person. Blood sugar was checked before and after the intervention.

3.14. TECHNIQUES OF DATA ANALYSIS AND INTERPRETATION

Descriptive and inferential statistical techniques were used for data analysis. Descriptive statistics was applied for demographic variable analysis. Inferential statistics was used to assess the significance of test and correlation of variables. Paired 't' test was used to find out the significance of acupressure therapy in experimental

group and control group. Unpaired 't' test was used to find out the comparison of post-test scores among experimental group and control group. Karl Pearson's coefficient of correlation was used to find out the correlation between demographic variables and blood sugar.

DATA ANALYSIS AND INTERPRETATION

This chapter represents the method of analysis and interpretation of data. Acupressure was administered to patients with Type 2 diabetes mellitus. The study was done to assess the effect of acupressure on blood sugar among patients with Type 2 diabetes mellitus. The findings were tabulated, analyzed and interpreted in this chapter. The data was computed using descriptive and inferential statistics.

SECTION I

4.1. DISTRIBUTION OF DEMOGRAPHIC DATA

The demographic data consists of age, sex, education, occupation, health history, diet history and anthropometric measurement. The data collected are presented in the form of tables and graphs.

TABLE 4.1
DISTRIBUTION OF DEMOGRAPHIC DATA AMONG DIABETES
PATIENTS

(N=30)

Demographic Data	Experimental Group		Control Group	
	No. of Patients	Percentage (%)	No. of Patients	Percentage (%)
Age in years				
45 – 50	4	27	4	27
50 - 55	3	20	1	7
55 – 60	1	7	2	13
60 – 65	6	40	2	13
65 – 70	1	6	4	27
70 – 75	-	-	2	13
Sex				
Male	8	53	7	47
Female	7	47	8	53
Education				
Primary	8	53	7	47
Secondary	4	27	5	33
Undergraduate	1	7	3	20
Post Graduate	2	13	-	-
Occupation				
Unemployed	9	60	11	73
Sedentary Work	1	7	-	-
Moderate Work	5	33	4	27
Heavy Work	-	-	-	-

The age distribution of patients among experimental group shows that 27% of patients are in the age group of 45 – 50 years, 20% are between 50 – 55 years, 7% are between 55 – 60 years, 40% between 60 – 65 years and 6% are between 65 – 70

years. In control group, 27% are between 45-50 years, 65-70 years respectively, 7% are between 50- 55 years, and 13% are between 55-60 years, 60 - 65 years and 70-75 years respectively. The sex distribution among experimental group shows that 53% are males and 47% are females. In control group 47% are males and 53% are females. The distribution of educational status among experimental group shows that 53% have primary education, 27% have secondary education, 7% are undergraduates and 13% are postgraduates. In control group, 47% have primary education, 33% have secondary education and 20% are undergraduates. The distribution of occupational status shows that, in experimental group 60% are unemployed, 7% are sedentary workers and 33% are moderate workers. In the control group 73% are unemployed and 27 % are moderate workers.

TABLE 4.2
DISTRIBUTION OF DIET HISTORY AMONG DIABETIC PATIENTS

(N=30)

Dietetics History	Experimental Group		Control Group	
	No. of Patients	Percentage (%)	No. of Patients	Percentage (%)
Frequency				
Two time / day	-	-	-	-
Three / day	15	100	15	100
Type of food				
Vegetarian	5	33	-	-
Non-Vegetarian	10	67	15	100

The distribution of frequency of diet shows that 100% of the samples of the experimental group and control group take meals 3 times a day. The distribution on type of foods among experimental group shows that 33% are vegetarian and 67% are non-vegetarian. In the control group 100% of the samples are non-vegetarian.

TABLE 4.3
DISTRIBUTION OF ANTHROPOMETRIC MEASUREMENT
AMONG DIABETIC PATIENTS

(N=30)

Anthropometric Measurement	Experimental Group		Control Group	
	No. of Patients	Percentage (%)	No. of Patients	Percentage (%)
Height (cm)				
145 – 150	-	-	1	7
150 – 155	1	7	-	-
155 – 160	2	13	3	20
160 – 165	2	13	3	20
165 – 170	8	53	5	33
170 – 175	2	13	3	20
Weight (kg)				
45 – 50	3	20	1	7
50 – 55	5	34	7	46
55 – 60	3	20	1	7
60 – 65	2	13	2	13
65 – 70	-	-	3	20
70 – 75	2	13	1	7
Body Mass Index (BMI)				
Under weight (below 8.5)	3	20	-	-
Normal weight (18.5 – 24.9)	9	60	13	87
Overweight (25 – 29.90)	3	20	2	13

The height distribution of patients among experimental group reveals that 7% are between the height 150 - 155 cm, 13% are between the height 155- 160 cm, 160-165 cm and 170-175cm respectively and 53% are between the height 165-170 cm. The distribution of height among control group reveals that 7% are between the height 145-150cm, 20% are between the height 155-160cm, 160-165 cm and 170-175cm respectively and 33% are between the height 165-170 cm.

The weight distribution of patients among experimental group reveals that 20% are between the weight 45-50 kg and 55-60 kg respectively, 33% are between the weight 50-55 kg, 13 % are between the weight 60-65 kg and 70-75 kg respectively. In control group 7% are between the weight 45-50kg, 55-60 kg and 70-75 kg respectively , 47% are between the weight 50-55 kg, 13% are between the weight 60-65 kg, 20% are between the weight 65-70 kg and 7% are between the weight 70-75 kg.

The distribution of body mass index among experimental group reveals that 20% of respondents are underweight, 60% have normal weight and 20% are overweight. In control group 87% are normal weight, 13% are overweight.

TABLE 4.4
DISTRIBUTION OF HEALTH HISTORY AMONG DIABETIC PATIENTS

(N=30)

Health History	Experimental Group		Control Group	
	No. of Patients	Percentage (%)	No. of Patients	Percentage (%)
Medications				
Insulin injection	7	47	8	53
Hypoglycemic agents	6	40	4	27
Not undergoing any treatment	2	13	3	20
Duration of Illness				
Recently diagnosed	5	33	5	33
Upto 5 yrs.	5	33	4	27
5 – 10 yrs	4	27	4	27
10 – 15 yrs	1	7	2	13
Personal Habits				
Smoking	3	20	3	20
Alcohol	1	7	1	7
Tobacco chewing	-	-	1	7
Not a smoker or alcoholic	11	73	10	66

The distribution of medications among the experimental group reveals that 47% are taking insulin injections, 40%are taking hypoglycemic agents and 13% are

not undertaking any treatment. In control group 53% are taking insulin injections, 27% are taking hypoglycemic agents and 20% are not undertaking any treatment.

The distribution of duration of illness among experimental group reveals that 33% are recently diagnosed. 33% are having diabetes for 5 years, 27% are having diabetes between 6 -10 years and 7 % are having diabetes between 11-15 years. In control group 33% are recently diagnosed, 27% are having diabetes for 5 years, 27% are having between 6-10 years and 13% are having diabetes between 11-15 years.

The distribution of personal habits among patients in experimental group reveals that 20% are smokers, 7% are alcoholics and 73% are non-smokers and non-alcoholics. In control group 20% are smokers, 7% are alcoholics, 7% are tobacco chewers and 66% are non-smokers and non-alcoholics.

FIG 4.1
AGE DISTRIBUTION OF DIABETIC PATIENTS

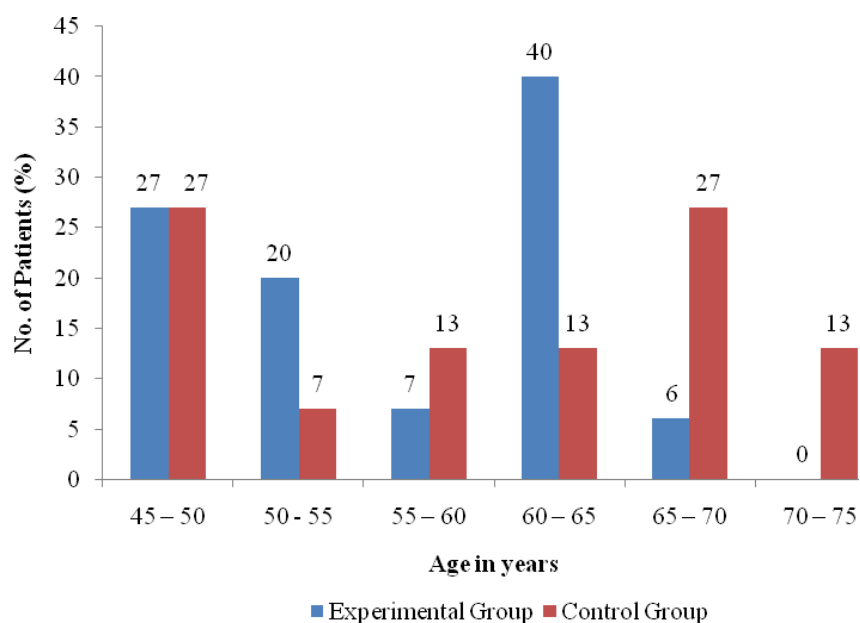


FIG. 4.2.
GENDER DISTRIBUTION OF DIABETIC PATIENTS

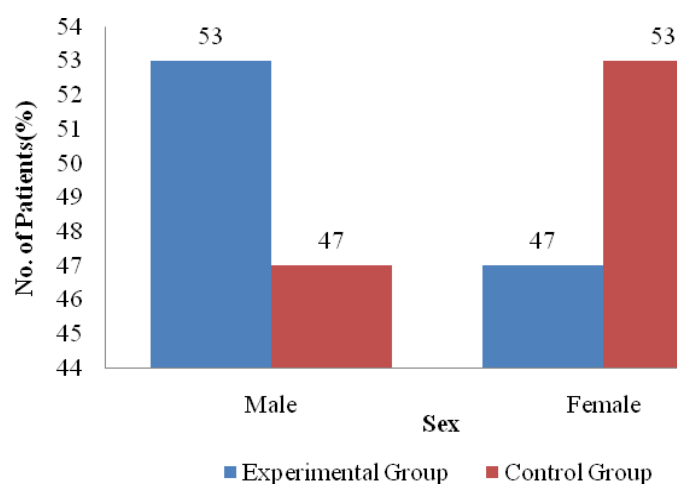


FIG. 4.3.
DISTRIBUTION OF EDUCATION AMONG DIABETIC PATIENTS

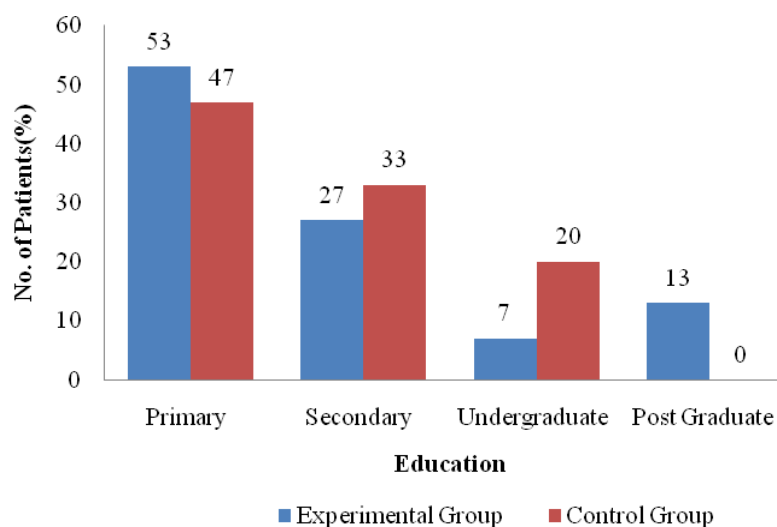


FIG. 4.4.
DISTRIBUTION OF OCCUPATION AMONG DIABETIC PATIENTS

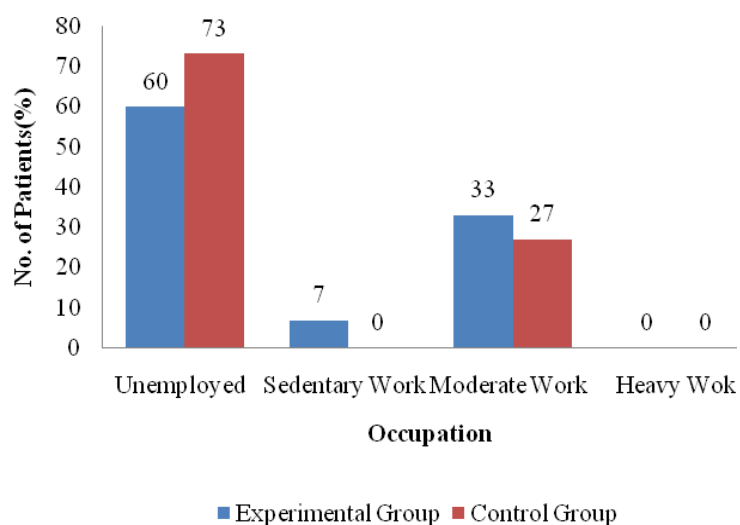


FIG. 4.5.
DISTRIBUTION ON TYPE OF FOOD AMONG DIABETIC PATIENTS

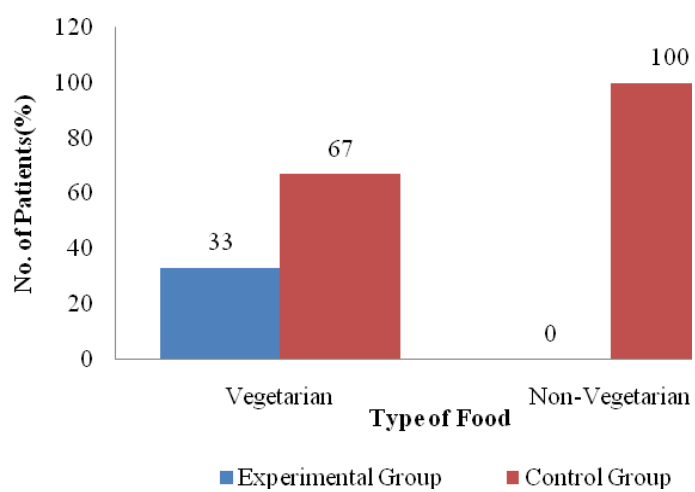


FIG. 4.6.
HEIGHT DISTRIBUTION OF DIABETIC PATIENTS

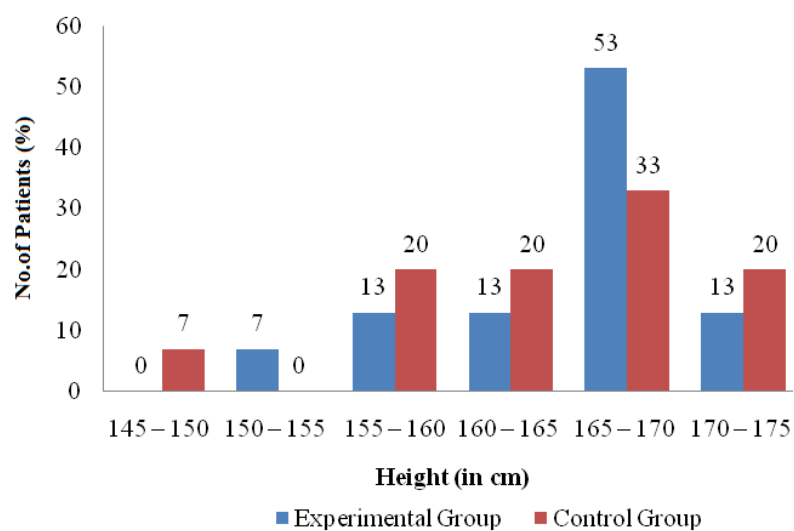


FIG. 4.7.
WEIGHT DISTRIBUTION OF DIABETIC PATIENTS

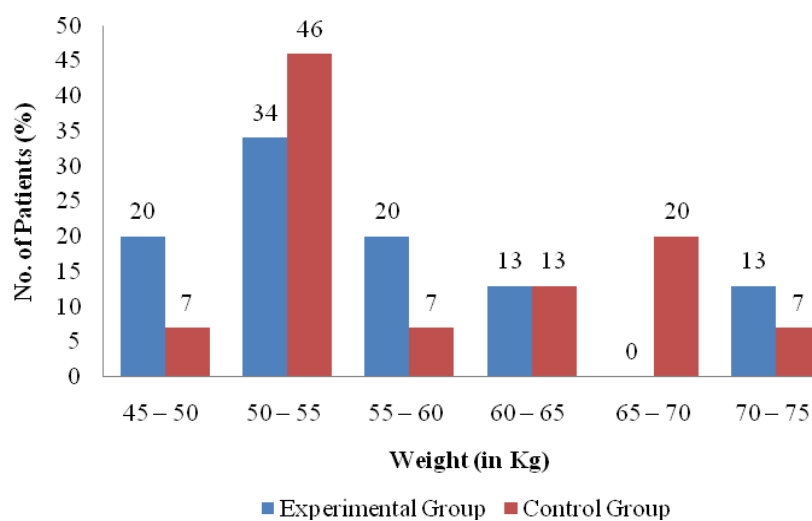


FIG. 4.8.
DISTRIBUTION OF BMI AMONG DIABETIC PATIENTS

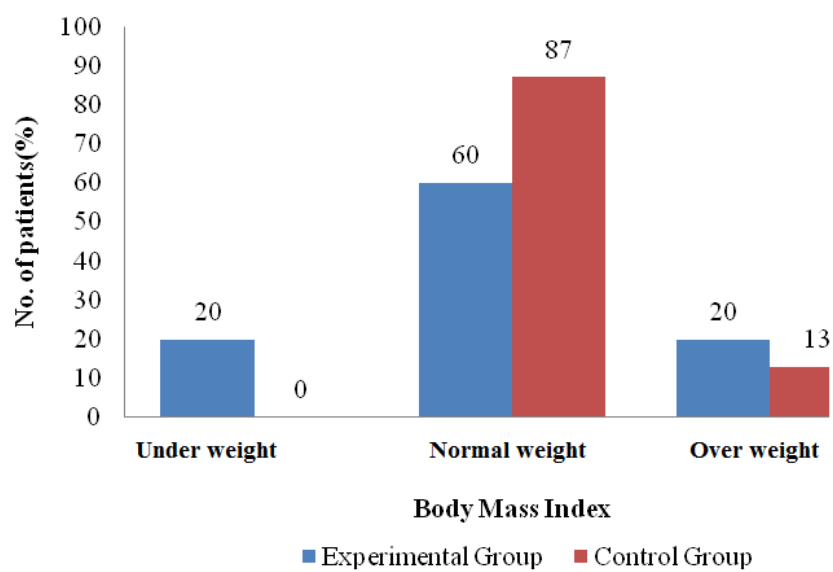


FIG. 4.9.
DISTRIBUTION OF MEDICATIONS AMONG DIABETIC PATIENTS

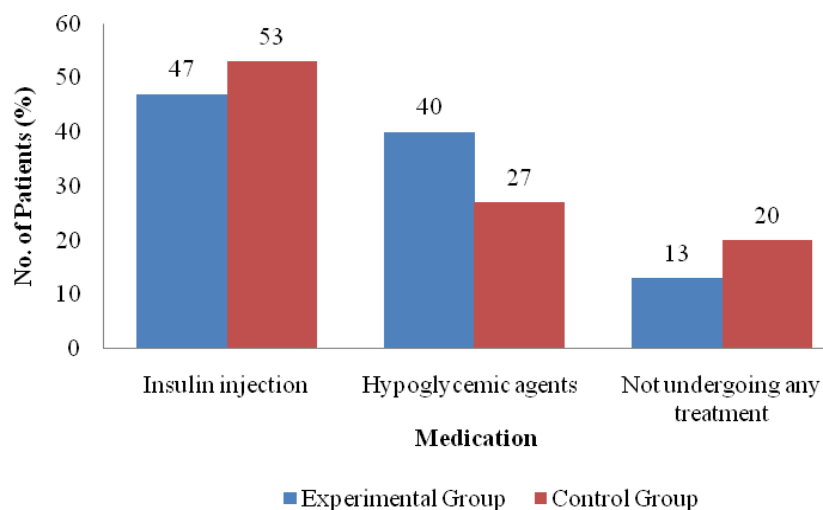


FIG. 4.10.
DISTRIBUTION ON DURATION OF ILLNESS
AMONG DIABETIC PATIENTS

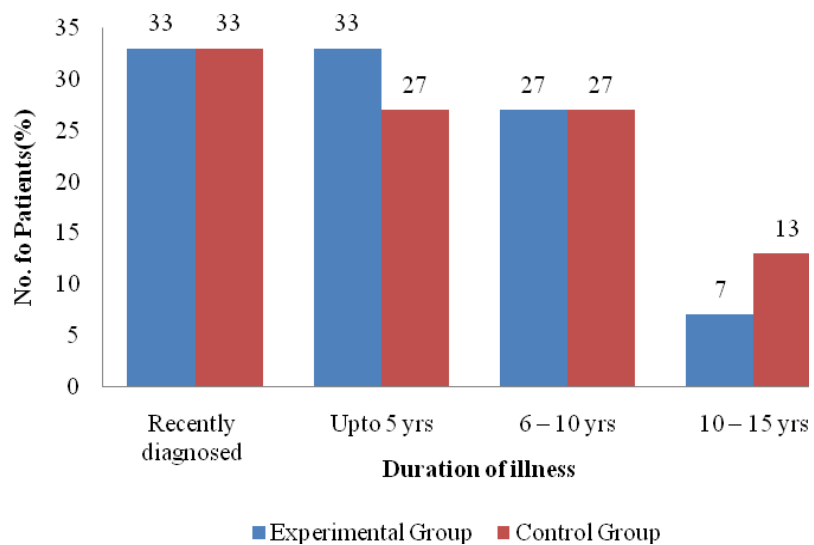
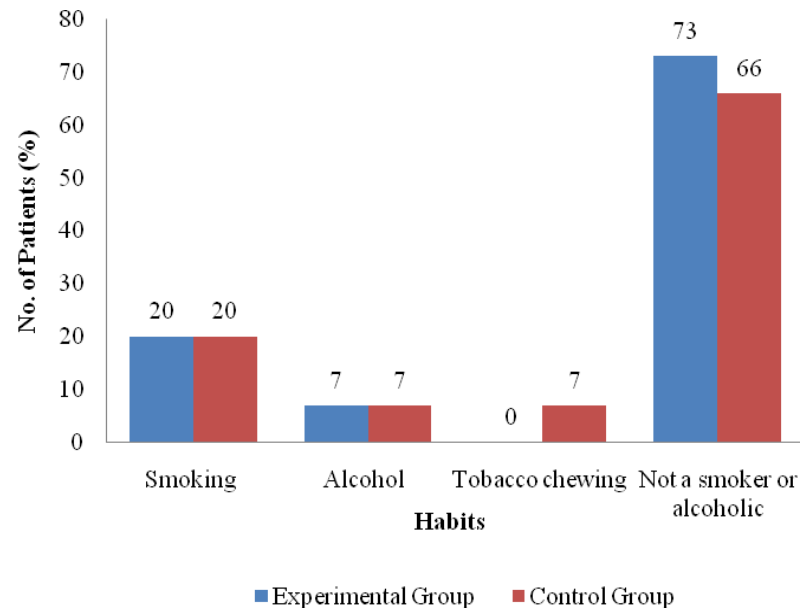


FIG. 4.11.
DISTRIBUTION OF HABITS AMONG DIABETIC PATIENTS



SECTION – II

4.5. COMPARISON OF BLOOD SUGAR LEVEL AMONG EXPERIMENTAL GROUP AND CONTROL GROUP BEFORE INTERVENTION

The table 4.5.represents the mean, mean difference and ‘t’ value of experimental group and control group before the intervention.

TABLE 4.5.
COMPARISON OF BLOOD SUGAR LEVEL AMONG EXPERIMENTAL
GROUP AND CONTROL GROUP BEFORE INTERVENTION

(N=30)

Acupressure	Mean	Mean Difference	SD	‘t’
Experimental group	297	42	36	1.86*
Control group	255		75	

*Significant at 0.05 level

The calculated ‘t’ value was 1.86 and the table value was 1.701 at 28 degrees of freedom with 0.05 level of significance. There is a mild difference between calculated ‘t’ value and the table value. The blood sugar levels of the experimental group and the control group before the intervention proves the homogeneity of the groups. The resultsshow that the treatment underwent by the patients during hospital stay also influence the blood sugar level.

4.6. ANALYSIS ON EFFECT OF ACUPRESSURE ON BLOOD SUGAR LEVEL AMONG EXPERIMENTAL GROUP

Analysis of blood sugar level among patients with Type II diabetes mellitus before and after intervention was calculated using paired 't' test. This is to find out the influence of acupressure among patients with Type II diabetes mellitus. The table 4.5 represents the mean, standard deviation, mean difference and 't' value of experimental group before and after the intervention.

TABLE 4.6.
DISTRIBUTION OF BLOOD SUGAR LEVEL AMONG EXPERIMENTAL
GROUP BEFORE AND AFTER INTERVENTION

(N=15)

Acupressure	Mean	Standard Deviation	Mean Difference	't'
Before Intervention	297	36	90	7.387*
After Intervention	207	39		

*Significant at 0.05 level

The mean score of diabetic patients before receiving acupressure for experimental group was 297 and it was decreased to 207 after intervention. To test the significance mean difference and paired 't' test was applied.

The calculated 't' value 7.387 at 14 degrees of freedom was compared with table value 1.761 at 0.05 level of significance. The calculated value was higher than the table value the alternative hypothesis was accepted. Hence, there existed a significant effect on the administration of acupressure therapy on reducing the blood

sugar level among patients with Type 2 diabetes mellitus. This proved that the acupressure therapy had a significant role in reducing the blood sugar level.

4.7. ANALYSIS OF BLOOD SUGAR LEVELS AMONG CONTROL GROUP

The table 4.6.represents the mean, standard deviation, mean difference and ‘t’ value of control group before and after the intervention.

TABLE 4.7.
DISTRIBUTION OF BLOOD SUGAR LEVEL AMONG CONTROL GROUP
BEFORE AND AFTER INTERVENTION

(N=15)

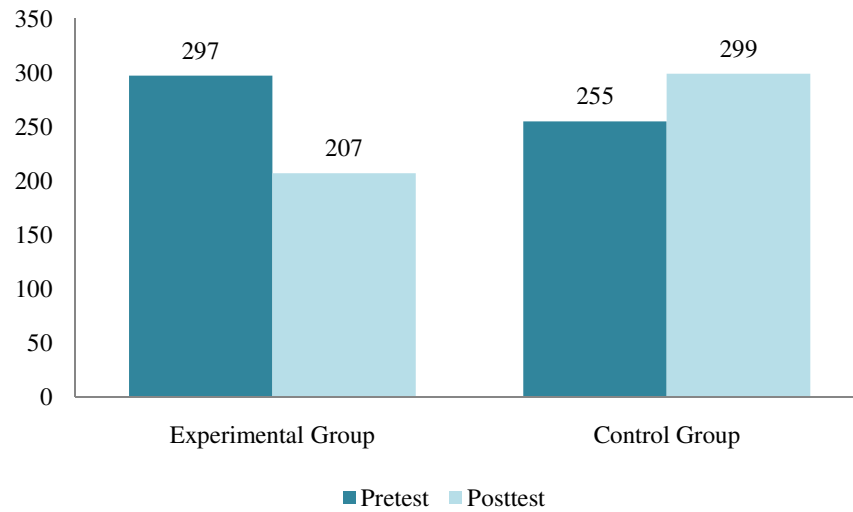
Acupressure	Mean	Standard Deviation	Mean Difference	‘t’
Before Intervention	255	75		
After Intervention	299	49	44	1.631*

*Significant at 0.05 level

The mean score of diabetic patients in control group of pretest shows a score of 255, and the post test was increased to 299 without intervention. ‘t’ test was used to test if there exists any significance in the mean difference.

The calculated ‘t’ value 1.631 was compared with table value 1.761 at 14 degrees of freedom with 0.05 level of significance.As the calculated value was lower than the table value the hypothesis was accepted.This proved that there is no significant difference in blood sugar level among control group without intervention.

FIG. 4.12.
DISTRIBUTION OF BLOOD SUGAR VALUES AMONG
EXPERIMENTAL AND CONTROL GROUP



4.8. COMPARISON OF BLOOD SUGAR LEVEL AMONG EXPERIMENTAL GROUP AND CONTROL GROUP AFTER INTERVENTION

The table represents the mean, mean difference and 't' value of experimental and control group after the intervention.

TABLE 4.8.
COMPARISON OF BLOOD SUGAR LEVEL AMONG EXPERIMENTAL
GROUP AND CONTROL GROUP AFTER INTERVENTION

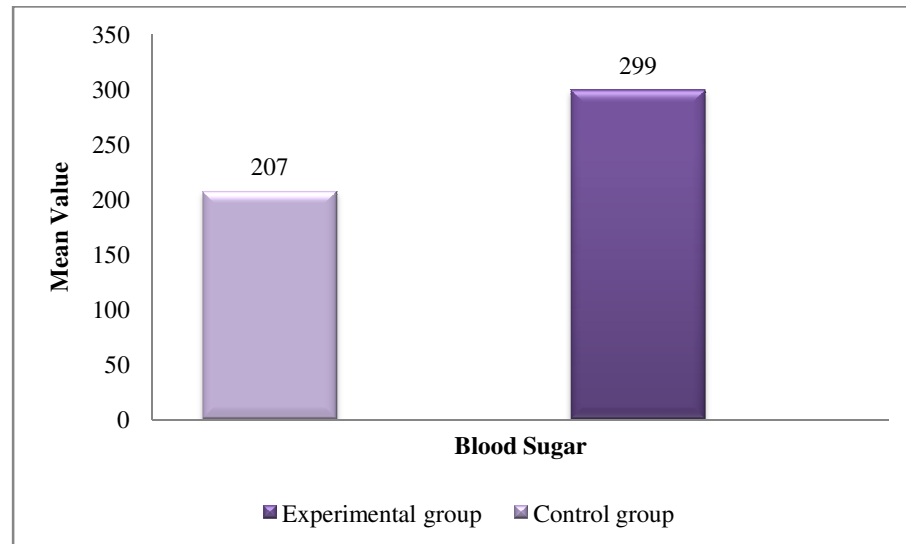
(N=30)

Acupressure	Mean	Mean Difference	SD	't'
Experimental group	207	92	39	5.496*
Control group	299		49	

*Significant at 0.05 level

The calculated 't' value was 5.496 and the table value was 1.701 at 28 degrees of freedom with 0.05 level of significance. The calculated t value was higher than the table value. This proved that acupressure therapy had a significant role in reducing the blood sugar level.

FIG. 4.13.
DISTRIBUTION OF BLOOD SUGAR LEVEL AMONG EXPERIMENTAL
GROUP AND CONTROL GROUP AFTER THE INTERVENTION



SECTION –III

4.9. RELATIONSHIP BETWEEN BMI AND THE LEVEL OF BLOOD SUGAR

Karl Pearson's coefficient correlation was used to assess the influence of demographic variables on level of blood sugar before intervention. The table 4.8.represents the correlation exists between the age, medication, body mass index, duration of illness and pre test scores of experimental group.

TABLE 4.9.
RELATIONSHIP OF BMI ONLEVEL OF BLOOD SUGAR

(N=30)

Demographic Variables	'r'
BMI	0.533

The above results indicate the influence of BMI among patients with diabetes mellitus. It is found that BMI is positively correlated with blood sugar level.

RESULTS AND DISCUSSION

This chapter deals with the interpretation of results and discussion of the findings. The analyzed data are being discussed under various headings. It deals with the demographic data profile of patients with Type 2 diabetes mellitus, findings related to the effectiveness of acupressure on experimental group and control group and the relationship between BMI and blood sugar level.

5.1. FINDINGS RELATED TO DEMOGRAPHIC DATA

5.1.1. Age

The age distribution shows that, among experimental group 27% are between the age group of 45-50 years, 20% between 50-55 years, 7% between 55-60 years, 40% between 60-65 years and 6% between 65-70 years. In control group 27% are between the age group 45-50 years and 65-70 years, 7% are between 50-55 years, 13% are between 60-65 years and 70-75 years.

A study was conducted to know the Modern Clinical Necessities for Traditional Chinese Medicine-Acupressure in Beijing. The acupoints anyinjiao (SP-6) was used as the primary treatment, with adjunctive points according to syndrome differentiation for 30 patients with diabetes. Among that the common adjunct points were sanjiaoshu (Liv-3) for thirst and dryness of the mouth; zusanli (ST-40) for hunger; and kidney (K-3) plus shenshu (Sp-6) for polyuria. Treatment was administered twice daily for 7 days as a course of treatment, then a 2-3 day break was allowed before starting another course up to 4 weeks. The result shows that the effectiveness of treatment was better for younger patients than for older patients (Wang, 2002).

5.1.2. Sex

The sex distribution shows that among experimental group 53% are males and 47% are females. In control group 47% are males and 53% are females.

5.1.3. Educational Status

The distribution of educational status among experimental group shows that 53% have primary education, 27% have secondary education, 7% are under-graduates and 13% are undergraduates. In control group 47% have primary education, 33% have secondary education and 20% are under graduates.

5.1.4. Occupation

In the distribution of occupational status in experimental group 60% are unemployed, 7% are sedentary workers and 33% are moderate workers. In control group 73% are unemployed and 27% are moderate workers.

5.1.5. Frequency of Diet

Distribution of frequency of diet shows that 100% of patients belonging to both experimental and control group takes meals three times per day.

5.1.6. Type of Food

Distribution of type of food shows that among the experimental group 33 % are vegetarian and 67 % are non-vegetarian. In control group 100% of patients are non-vegetarian.

5.1.7. Height

Distribution of height reveals that among experimental group 7% are between the height 150-155cm, 13% between 155-160cm, 160-165cm and 170-175 cm

respectively and 53% between 165-170cm. In control group, 7% are between the height 145-150cm, 20% between 155-160 cm, 160-165 cm, 170-175 cm respectively and 33% between 165-170cm.

5.1.8. **Weight**

Distribution of weight reveals that among the experimental group, 3% have weight between 45-50 kg, 50-55 kg and 55-60 kg respectively, 3% are between 55-60kg, 2% are between 60-65kg and 70-75kg respectively. In control group, 7% are between 45-50 kg and 55-60 kg and 70-75 kg respectively, 46% are between 50-55kg, 13% between 60-65 kg and 20% are between 65-70kg.

5.1.9. **BMI**

The distribution of body mass index among experimental group reveals that 20% of respondents are underweight, 60% have normal weight and 20% are overweight. In control group 87% are normal weight, 13% are overweight.

Overweight or obesity increases the risk for diabetes. The risk of developing the disease is higher when weight is concentrated near the waist. Obesity is the result of eating more calories than we expend. The factors contributing to obesity includes diet (taking high fat and high calorie foods), lack of exercise, genetics, age, psychological issues, medications such as corticosteroids, antihypertensive, antidepressants and prenatal environmental factors such as small for gestational age (Ludwig, 2000).

5.1.10. Medications

The distribution of medications among the experimental group reveals that 47 % are taking insulin injections, 40%are taking hypoglycemic agents and 13% are not undertaking any treatment. In control group 53% are taking insulin injections, 27% are taking hypoglycemic agents and 20% are not undertaking any treatment.

5.1.11. Duration of Illness

The distribution of duration of illness among experimental group reveals that 33% are recently diagnosed. 33 % are having diabetes for 5 years, 27% are having diabetes between 6 -10 years and 7 % are having diabetes between 11-15 years. In control group 33% are recently diagnosed, 27 % are having diabetes for 5 years, 27 % are having between 6-10 years and 13% are having diabetes between 11-15 years.

5.1.12. Personal Habits

The distribution of personal habits among patients in experimental group reveals that 20% are smokers, 7 % are alcoholics and 73 % are non-smokers and non-alcoholics. In control group 20 % are smokers, 7% are alcoholics, 7% are tobacco chewers and 66% are non-smokers and non-alcoholics.

For people with diabetes smoking increases the risk for developing the disease which can lead to serious complications. Various studies have proved that diabetic patients who smoke have high blood sugar values, making the disease more difficult to control and put them to a greater danger of complications such as blindness, damage, kidney failure and heart problems (Park, 2011).

5.2. FINDINGS RELATED TO THE EFFECT OF ACUPRESSURE ON BLOOD SUGAR LEVEL AMONG EXPERIMENTAL GROUP AND CONTROL GROUP

Analysis of blood sugar level among patients with Type II diabetes mellitus before and after intervention was calculated using paired 't' test. This is to find out the influence of acupressure among patients with Type II diabetes mellitus. The blood sugar levels of the participants were assessed before and after the intervention using glucometer. The participants of the study were patients with Type 2 diabetes mellitus.

The table 4.5 represents the mean, mean difference and t value of experimental group and control group before the intervention. The calculated 't' value was 1.86 and the table value was 1.701 at 28 degrees of freedom with 0.05 level of significance. There was a mild difference between the calculated 't' value and the table value. The blood sugar levels of the experimental group and the control group before the intervention proves the homogeneity of the groups.

The table 4.6 represents the mean score of diabetic patients before receiving acupressure. For experimental group the mean score was 297 and it was decreased to 207 after intervention. To test the significance, paired 't' test was applied. The calculated 't' value 7.387 at 14 degrees of freedom was compared with the table value 1.761 at 0.05 level of significance. The calculated value was higher than the table value, thus the alternative hypothesis was accepted. Hence, the hypothesis **H₁: There is a significant difference in blood sugar level among experimental group before and after acupressure** is accepted.

The table 4.7.represents the mean score of diabetic patients in control group. The pretest mean score was 255, and the post test mean score was increased to 299 without intervention, 't' test was used to test the significance in the mean difference. The calculated 't' value 1.631 was compared with table value 1.761 at 14 degrees of freedom with 0.05 level of significance. The calculated 't' value was lower than the table value. This proved that there is no significant difference in blood sugar level among control group without intervention. Hence, the hypothesis **H₂: There is no significant difference in blood sugar level among control group before and after acupressure** is accepted.

The table 4.8.represents the mean, mean difference and t value of experimental and control group after the intervention. The calculated 't' value was 5.496 and the table value was 1.701 at 28 degrees of freedom with 0.05 level of significance. The calculated t value was higher than the table value. Thus, the hypothesis **H₃: There is a significant difference in blood sugar level among experimental and control group after acupressure** is accepted.

5.3. RELATIONSHIP BETWEEN BMI AND BLOOD SUGAR LEVEL

Karl Pearson's coefficient of correlation was used to assess the influence of body mass index on level of blood sugar before intervention. The correlation with BMI has shown a direct relationship with acupressure. So, there exists a positive correlation between BMI and acupressure (0.533).

SUMMARY AND CONCLUSION

This chapter summarizes the major findings, limitations, implications in the field of nursing education, nursing practice, nursing research and recommendations. The study was conducted to assess the effect of acupressure on blood sugar among patients with type 2 diabetes mellitus.

The present study was conducted for 30 days at Sri Ramakrishna Hospital, Coimbatore. A quasi experimental design was adopted and purposive sampling was used to select the samples. Total number of participants selected for the study was 30.

6.1. MAJOR FINDINGS OF THE STUDY

1. The demographic data of patients with Type 2 diabetes reveals that among experimental group 53% of patients are males and 47% of patients are females. In control group 47% of patients are males and 53% of patients are females.
2. The distribution of diet history reveals that 67% of participants are non-vegetarian and 37% are vegetarian
3. The majority of participants are recently diagnosed with Type 2 diabetes mellitus.
4. Among the patients, 73 % are non-smokers.
5. Acupressure was effective in reducing the blood sugar among patients with Type 2 diabetes mellitus. There was a significant reduction in blood sugar in post-test scores of experimental group compared to pre-test.
6. An average variation of 50-100mg/dl of reduction was found in the blood sugar level among experimental group.
7. There was a significant association between BMI and blood sugar level.

6.2.LIMITATIONS OF THE STUDY

- 1 Acupressure treatment was not recommended to be given within two hours of taking any drug.
- 2 Acupressure treatment should not be taken immediately after meals or on full stomach. The treatment should be taken two hours after meals.
- 3 The study was confined to a shorter period which limits the generalization.

6.3.RECOMMENDATIONS

1. The intervention can be reinforced as a regular practice in hospital settings.
2. Similar study can be replicated in other settings.
3. An extensive experimental study can be conducted for larger number of samples in the health care settings.
4. A comparative study can be done with one group receiving acupressure along with medical treatment and another group receiving acupressure alone as a treatment modality for diabetes.
5. Acupressure can be used along with the medical management among patients who are found to be pre-diabetic during the treatment period in hospitals.

6.4. NURSING IMPLICATIONS

6.4.1. Nursing education

People with diabetic mellitus receive various methods of treatment. To manage the symptoms effectively many are turning to alternative therapies like herbal medicines and various other topical agents. Among these therapies, Acupressure is one of the most popular alternative therapies. In the field of nursing education, the administration of acupressure is effective in preventing complications associated with

diabetes in the early stage itself. Thus, it is appropriate to incorporate alternative therapies like acupressure into nursing education.

6.4.2. Nursing Administration

The nurses should be trained in implementing acupressure therapy to bring out positive physical and psychological responses as an adjunctive to other pharmacological treatment to promote comfort and well being among type 2 diabetes mellitus patients.

6.4.3. Nursing Practice

The nursing practice emphasizes the need to focus more on the evidence based and holistic practice through the various techniques that can bring about significant positive and psychological outcomes for patients with type 2 diabetes mellitus.

6.4.4. Nursing Research

The nursing research intends to offer upto date suggestions in implementing the alternative treatments like acupressure application as one of the nursing intervention for diabetes which is an affordable and effective way of treating the condition.

CONCLUSION

The study was conducted to find the effect of acupressure on blood sugar among patients with type 2 diabetes mellitus. Most of the patients were cooperative and there was a significant reduction in the blood sugar level. Hence, the study effect of acupressure on blood sugar among patients with Type2 diabetes was effective.

From

Ms. Mary Treesa Joseph,
M.Sc Nursing II year,
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore -44.

To

Dr.M.Jayakumar, B.Sc.M.B.B.S, M.D., (Int. MED),
Consultant Physician,
Reg.No.49791,
Sri Ramakrishna Hospital,
Coimbatore

Through

The Principal,
College of Nursing,
Sri Ramakrishna Institute of Paramedical Science:
Coimbatore -44.

Sub: Letter requesting permission for conduct the research study.

Respected Sir,

I Ms. Mary Treesa Joseph doing my M.Sc (N) II Year in College of Nursing, Sri Ramakrishna Institute of Paramedical Sciences, as a part of my curriculum requirement under The Tamil Nadu Dr. M.G.R. Medical University has to conduct Research, I have selected study on "EFFECTIVENESS OF ACUPRESSURE FOR REDUCING THE BLOOD SUGAR AMONG PATIENTS WITH TYPE II DIABETES MELLITUS IN SELECTED HOSPITALS, COIMBATORE".

I kindly request you grant me permission. I assure that I will abide the rules of the institution and information collected from the study participants will not be disclosed.

Thanking you,

Yours faithfully,

Coimbatore:

Date: 15/6/2011


PRINCIPAL,
College of Nursing,
Sri Ramakrishna Institute of Paramedical Science,
Coimbatore - 541 044.

(Ms. Mary Treesa Joseph)

APPENDIX -I

Permission letter for conducting study

From
Mary Treesa Joseph
M.Sc Nursing I year,
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore -44.

To
The Dean
Sri Ramakrishna hospital
Coimbatore- 44

Through
The Principal,
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore -44.

Sub: Letter requesting permission for conducting the research study.

Respected Sir,

I ,Ms.Mary Treesa Joseph doing my M.Sc (N) I Year in College of Nursing, Sri Ramakrishna Institute of Paramedical Sciences is interested to do one research study on **"EFFECTIVENESS OF ACUPRESSURE FOR REDUCING THE BLOOD SUGAR AMONG PATIENTS WITH TYPE II DIABETES MELLITUS IN SELECTED HOSPITALS , COIMBATORE"**. This is a part of curriculum requirement ,under The Tamil Nadu Dr. M.G.R. Medical University . The study will be conducted on Sri Ramakrishna hospital , Coimbatore .

So I kindly request you to grant me permission for doing the study in the selected setting.. I assure that I will abide the rules of the institution, and information collected from the study participants will not be disclosed.

Thanking you,

Yours faithfully,

Coimbatore

Date: 25/1/2011

(MARY TREESA JOSEPH)

R. Ramathidev
for **PRINCIPAL**
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences
Coimbatore - 641 044.

FORMAT FOR CONTENT VALIDITY

Name of the expert **Dr.M.Jayakumar, B.Sc.M.B.B.S, M.D., (Int. MED),**

Address: **Consultant Physician,
Reg.No.49791,
Sri Ramakrishna Hospital,
Coimbatore**

Kindly validate each tool and tick wherever applicable

S.No	Sections of the tool	Strongly agree	Agree	Needs modification	Remarks
1	SECTION A				
2	SECTION B				
3	SECTION C				

Total content for the tool : ☒ Adequate / ☒ Inadequate

Date: 26/7/201


Signature of the expert

Dr.M.JAYAKUMAR, B.Sc. M.B.B.S, M.D. (INT MED)
CONSULTANT PHYSICIAN
REG. NO. 49791
SRI RAMAKRISHNA HOSPITAL
COIMBATORE. CELL : 93422 23592

FORMAT FOR CONTENT VALIDITY

Name of the expert: **M.D.Anuratha,**

Address: **Associate Professor,
PSG College of Nursing,
Coimbatore-4.**

Kindly validate each tool and tick wherever applicable

S.No	Sections of the tool	Strongly agree	Agree	Needs modification	Remarks
1	SECTION A		✓		
2	SECTION B		✓		
3	SECTION C	✓			
4	SECTION D	✓	✓	✓	✓

Total content for the tool : Adequate /Inadequate ✓

Date: 13/01/2011

Signature of the expert

(M.D. ANURATHA)

Appendix - II

Letter of Request for Validation of the Research Tool and Content

From

Ms. Mary Treasa Joseph
M.Sc Nursing I year,
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore -44.

To

M.D. Anuratha,
Associate Professor,
PSG College of Nursing,
Coimbatore-4.

Through

The Principal,
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore -44.

Sub: Requisition for content validity

Respected Madam,

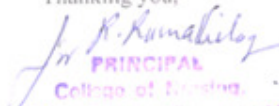
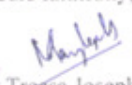
I Ms. Mary Treasa Joseph doing my M.Sc (N) I Year in College of Nursing, Sri Ramakrishna Institute of Paramedical Sciences, as a part of my curriculum requirement under The Tamil Nadu Dr. M.G.R. Medical University has to conduct Research, I have selected study on "EFFECTIVENESS OF ACUPRESSURE FOR REDUCING THE BLOOD SUGAR AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS IN SELECTED HOSPITALS, COIMBATORE"

I sincerely request to extend your guidance for my content validity.

Thanking you,

Coimbatore

Date: 9/6/2011


PRINCIPAL
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore -44. Yours faithfully,

(Mary Treasa Joseph)

FORMAT FOR CONTENT VALIDITY

Name of the expert: **Professor.Dr.S.Madhavi,**

Address: **Principal,
KMCH College of Nursing,
Coimbatore**

Kindly validate each tool and tick wherever applicable

S.No	Sections of the tool	Strongly agree	Agree	Needs modification	Remarks
1	SECTION A		✓		
2	SECTION B		✓		
3	SECTION C		✓		
4	SECTION D		✓		

Total content for the tool : Adequate /Inadequate

can add HbA1c. if possible ~~is it~~ employ a control group & do it as experimental study.

Date: 15/6/2011

Signature of the expert
The Principal
K.M.C.N. College of Nursing,
P.O.Box 3533, Vinayaki Road,
Coimbatore - 641 014.

From

Ms.Mary Treesa Joseph
M.Sc Nursing I year,
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore -44.

To

Professor.Dr.S.Madhavi,
Principal,
KMCH College of Nursing,
Coimbatore

Through

The Principal,
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore -44.

Sub: Requisition for content validity

Respected Madam,

I Ms.Mary Treesa Joseph doing my M.Sc (N) I Year in College of Nursing, Sri Ramakrishna Institute of Paramedical Sciences, as a part of my curriculum requirement under The Tamil Nadu Dr. M.G.R. Medical University has to conduct Research, I have selected study on "EFFECTIVENESS OF ACUPRESSURE FOR REDUCING THE BLOOD SUGAR AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS IN SELECTED HOSPITALS, COIMBATORE"

I sincerely request to extend your guidance for my content validity.

Thanking you,

Coimbatore

Date: 13/6/2011.

K. Ramakrishna
PRINCIPAL
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore - 641 044.

Yours faithfully,

Mary Treesa Joseph

(Mary Treesa Joseph)

FORMAT FOR CONTENT VALIDITY

Name of the expert: Mr.P.Kuzhanthaivel,

Address: Associate Professor,
KMCH College of Nursing,
Avinashi Road,
Coimbatore-14.

Kindly validate each tool and tick wherever applicable

S.No	Sections of the tool	Strongly agree	Agree	Needs modification	Remarks
1	SECTION A		✓		
2	SECTION B		✓		
3	SECTION C		✓		
4	SECTION D		✓		

Total content for the tool : Adequate /Inadequate

Date: 13.06.2011



P. Kuzhanthaivel
Signature of the expert

From

Ms.Mary Treesa Joseph
M.Sc Nursing I year,
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore -44.

To

Mr.P.Kuzhanthaivel,
Associate Professor,
KMCH College of Nursing,
Avinashi Road,
Coimbatore-14.

Through

The Principal,
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore -44.

Sub: Requisition for content validity

Respected Madam,

I Ms.Mary Treesa Joseph doing my M.Sc (N) II Year in College of Nursing, Sri Ramakrishna Institute of Paramedical Sciences, as a part of my curriculum requirement under The Tamil Nadu Dr. M.G.R. Medical University has to conduct Research, I have selected study on "EFFECTIVENESS OF ACUPRESSURE FOR REDUCING THE BLOOD SUGAR AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS IN SELECTED HOSPITALS,COIMBATORE"

I sincerely request to extend your guidance for my content validity.

Thanking you,

Coimbatore

Date: 13/11/2011

K. Kamauday
PRINCIPAL
College of Nursing,
Sri Ramakrishna Institute of Paramedical Sciences,
Coimbatore - 641 044.

Yours faithfully,
Mary Treesa Joseph
(Mary Treesa Joseph)

Appendix - IV

Certificate of Training in Acupressure Therapy

36, VENKATASAMY LAYOUT,
OFF V.K.K. MENON ROAD,
SIDDHAPUDUR, COIMBATORE 641044,
TAMIL NADU

Mobile: +91 98435 04444
Email: yovan36@gmail.com



JOHN ANDREWS,
Health Care consultant
& Reflexologist

**GRACE
HEALTH
CARE**

**REFLEXOLOGY & VARMAKALAI
SPECIALITY TREATMENT**

CERTIFICATE

This is to certify that **MARY TREESA JOSEPH**

..... has undergone Acupressure Therapy course

and successfully completed the theory, practical examination in February 2011.

Date: 03/02/2011


Director

CONSULTING TIME: 9AM – 6 PM (WITH PRIOR APPOINTMENT ONLY)

APPENDIX – V

CERTIFICATE OF ENGLISH EDITING

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the dissertation “**Effect of Acupressure among patients with Type II Mellitus in Sri Ramakrishna Hospital, Coimbatore**” done by **Mary Treesa Joseph** II year M Sc. Nursing, College of Nursing, Sri Ramakrishna Institute of Paramedical Sciences, Coimbatore, has been edited for English language appropriateness.

Name *Dr. Marie Louisa Francis*

Designation *Reader in English.*

Name of the Institution *K.V.H Institute of English
KVM Trust, Cherthala*

Signature *Bances*

